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Hitoshi Okamoto

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EXAMINER

SUKHAPHADHANA, CHRISTOPHER T

ART UNIT

PAPER NUMBER

2625

DATE MAILED: 07/15/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/716,445

Applicant(s)

OKAMOTO, HITOSHI

Examiner

Christopher T. Sukhaphadhana

Art Unit

2625

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 04 June 2004.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-22 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-22 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 21 November 2000 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____

DETAILED ACTION

Response to Amendment

1. The Amendment filed 4 June 2004 has been entered in full.

Claim Objections

2. **Claims 1, 2, 6, 17, 18, and 21** are objected to because of the following informalities: In regards to **claims 1 and 21**, “the image data pieces” on line 3 of the claim lacks proper antecedent basis. Consider restoring to --the image data piece--. In regards to **claim 2**, consider replacing “the image data” on line 4 of the claim with --the image data piece--. Limitation 1 of claim 1 associates the characteristic values with “an image data piece” and not the broad term “image data”. In regards to **claim 6**, consider restoring “fuzz theory” to --fuzzy theory--. In regards to **claims 17 and 18**, consider removing the redundant phrase “having been executed” from the end of the claim. Appropriate correction is required.

Response to Arguments

3. Applicant's arguments regarding the Yaung and Desai rejections under 35 USC 103 on pages 10-12 of the Amendment filed 4 June 2004 have been fully considered but they are not persuasive.
4. Applicant argues in substance that:
5. Yaung and Desai does not teach or suggest “characteristic value extraction unit that extracts n types of characteristic value vectors”. Specifically, Yaung extracts only four (not n) image search features, and Yaung’s similarity matrix is not vector data.

Art Unit: 2625

6. First, Examiner agrees that Yaung's similarity matrix is not vector data. However, the four image search features mentioned in Applicant's argument (average color, histogram color, positional color, texture) would constitute vector data.

7. Second, Examiner concedes that Yaung probably does not cover the full range of n that Applicant intends to cover. However, Yaung still anticipates the limitation for at least $n = 4$. Consider also col 2, line 43, in light of col 2, line 18.

8. Therefore, Yaung and Desai teach or suggest "characteristic value extraction unit that extracts n types of characteristic value vectors" and the remaining limitations of claim 1 to the extent required under 35 USC 103.

9. Applicant's arguments regarding the Craver rejections under 35 USC 103 on pages 12-13 of the Amendment filed 4 June 2004 have been fully considered but they are not persuasive.

10. Applicant argues in substance that:

11. Craver does not teach a sorting register as claimed. Furthermore, Craver does not provide motivation for combining a sorting register unit.

12. The section the Examiner references regarding a sorting register includes: "Additionally, in one embodiment, images further away from the center, or target image, are displayed with a smaller size to denote greater dissimilarity from those images closer to the center." (col 8, line 39). This statement directly implies a sorting register structure to place the images in an order of similarity/dissimilarity from a center image. Therefore, Craver teaches or suggests a sorting register as claimed. See also the display structures in Fig 4 and 5.

13. The motivation for combining Craver's sorting register unit was presented in paragraph 29 of the previous Office Action: "It would have been obvious to one of ordinary skill in the art

Art Unit: 2625

at the time of the invention to combine the first and second embodiments with the third embodiment because it allows easy selection of the target image from any of the displayed images (col 8, line 59) and images further away from the target image is displayed with a smaller size to denote greater dissimilarity (col 8, line 40).”

14. No further specific arguments were directed towards the patentability of the remaining claims.

Claim Rejections - 35 USC § 103

15. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

16. **Claims 1-3, 6-9, 11, 12, and 16-22** are rejected under 35 U.S.C. 103(a) as being unpatentable over Yaung (U.S. Patent 6,512,850 B2, newly cited, “Yaung”) in combination with Desai et al (U.S. Patent 6,072,904, newly cited, “Desai”).

17. In regards to **claim 1**, Yaung discloses an image data sorting device (Fig 1) comprising: a characteristic value extraction unit (ref no 308, Fig 3, and col 3, line 49) that extracts characteristic values of an image data piece from the image data piece, wherein extracted characteristic values (col 3, line 49) are expressed in I_j dimensional vector ($j = 1, 2, \dots, n$, here $1 \leq I_j, 1 \leq n$) in which n types of characteristic values vectors are obtained (col 6, line 20); a relation evaluation unit (ref no 316, Fig 3, and col 4, line 58) that evaluates a mutual relation between the characteristic value vectors that the characteristic value extraction unit extracts from

Art Unit: 2625

plural image data pieces; and a clustering unit (ref no 318, Fig 3, and col 5, line 3) that executes clustering to events expressed by the characteristic value vectors of the plural image data pieces on the basis of an evaluation result of the relation acquired by the relation evaluation unit.

Yaung does not expressly disclose a sorting register as claimed. However, Yaung does teach in col 5, line 21, that image objects corresponding to the image object identifiers in one or more clusters may then be easily retrieved and visually displayed on visual output device. Yaung does not expressly teach how the image objects in the clusters are displayed or their manner of presentation.

Desai teaches in col 5, line 65, a sorting register unit that automatically sorts the plural image data pieces on the basis of a result of clustering by the clustering unit. Specifically, Desai teaches a sorted list wherein the identifiers of the images are placed in the list in order of ascending distance from the target histogram vector. This ordered list is returned for presentation of the images to the user, typically by displaying the first ten closest pictures, then the next 10, etc.

It would have been obvious to one of ordinary skill in the art at the time of the invention to incorporate Desai's sorting register unit into Yaung's image data sorting device because it would present the user with images in a relevant order. These two teachings are compatible in the sense that Desai (col 5, line 63) uses a distance between target histogram vector and data base image histogram vectors as a measure of relevance, while Yaung (col 4, line 67) uses a similarity value as a measure of relevance.

Art Unit: 2625

Furthermore, the four image search features mentioned in Applicant's argument (average color, histogram color, positional color, texture) would constitute vector data. Yaung anticipates the limitation for at least $n = 4$

18. In regards to **claim 2**, Yaung further discloses the device wherein: the characteristic extraction unit extracts the n types of characteristic value vectors as the characteristic value of the image data (col 3, line 49 and col 2, line 18); and the relation evaluation unit, synthesizing (col 4, line 57) the n types of characteristic value vectors as to each of the n types of the characteristic value vectors that the characteristic value extraction unit extracts from the plural image data pieces, evaluates the relation (col 4, line 64) between the image data pieces based on synthesis result.

19. In regards to **claim 3**, Yaung further discloses in col 5, line 3, and Fig 5, "cluster J", the device wherein the clustering unit executes clustering by means of a non-hierarchical method based on a cluster number.

20. In regards to **claim 6**, Yaung further discloses in col 5, line 9, "threshold criteria data" the clustering unit executing clustering by means of a crisp technique that does not employ the fuzzy theory.

21. In regards to **claim 7**, Yaung further discloses in Fig 5, "cluster J", the clustering unit including a cluster number specifying unit that specifies a cluster number when executing clustering.

22. In regards to **claim 8**, Yaung further discloses the device further comprising: an image storage unit (ref no 106, Fig 1) that stores plural image data pieces; and an image management

Art Unit: 2625

unit (ref no 202, Fig 2) that manages the plural image data pieces stored in the image storage unit on the basis of a sorting result by the sorting register unit.

23. In regards to **claim 9**, Yaung further discloses in col 4, lines 15-26, the image management unit managing the plural image data pieces stored in the image storage unit on the basis of the sorting result by the sorting register unit and attribute information relating to the image data pieces, which are given to the plural image data pieces.

24. In regards to **claim 11**, Yaung further discloses in col 12, line 7, the clustering unit and the sorting register unit executing clustering and sorting of the image data pieces stored in the image storage unit each time a specific period of time passes.

25. In regards to **claim 12**, Yaung further discloses in col 12, line 1, the device wherein when there is a new image data piece to be stored in the image storage unit after clustering and sorting of the image data pieces stored in the image storage unit, the clustering unit and sorting register unit execute sorting of the new image data piece in such a manner that the new image data piece belongs to a cluster having the highest relation among existing clusters relating to the image data pieces stored in the image storage unit.

26. In regards to **claim 16**, Yaung further discloses in col 12, line 4, the device wherein when a specific time passes after sorting by the sorting register unit, the clustering unit and the sorting register unit destroy the existing sorting and execute clustering and sorting of all of the image data pieces stored in the image storage unit.

27. In regards to **claim 17**, Yaung further discloses in col 6, line 9, the device further comprising an image output unit that outputs image data pieces located near the center of each

Art Unit: 2625

cluster, upon completion of clustering by the clustering unit and sorting by the sorting register unit.

28. In regards to **claim 18**, Yaung further discloses in col 6, line 9, the device further comprising an image output unit that outputs image data pieces having a high relation with image data pieces located near the center of each cluster, upon completion of clustering by the clustering unit and sorting by the sorting register unit.

29. In regards to **claim 19**, Yaung further discloses in col 6, line 9, the image output unit outputs only the image data pieces relating to a designated cluster.

30. In regards to **claim 20**, Yaung further discloses in col 11, line 67, the device wherein after clustering by the clustering unit and sorting by the sorting register unit have been executed, when clustering by the clustering unit and sorting by the sorting register unit are executed again, the image output unit again outputs image data pieces after being sorted again.

31. In regards to **claim 21**, all the elements set forth in this claim have been addressed in the argument of claim 1.

32. In regards to **claim 22**, all the elements set forth in this claim have been addressed in the argument of claim 2.

33. **Claim 5** is rejected under 35 U.S.C. 103(a) as being unpatentable over Yaung (U.S. Patent 6,512,850 B2, cited above, "Yaung") and Desai et al (U.S. Patent 6,072,904, cited above, "Desai") as applied to claim 1 above, in further combination with Lim (U.S. Patent 6,574,378 B1, newly cited, "Lim").

Art Unit: 2625

34. In regards to **claim 5**, Yaung and Desai do not expressly disclose the clustering unit executing clustering by means of a fuzzy technique that employs a fuzzy theory.

Specifically, Yaung discloses the clustering means using threshold criteria data (col 5, line 18).

Lim teaches a clustering unit (col 7, lines 37-55) executing clustering by means of a fuzzy technique that employs the fuzzy theory.

It would have been obvious to one of ordinary skill in the art at the time of the invention to incorporate Lim's clustering unit in place of Yaung's clustering unit because fuzzy clustering is unsupervised (Lim, col 7, line 4) and Lim's fuzzy algorithm is the fuzzy equivalent of a classical "hard" clustering algorithm (col 7, line 38).

35. **Claims 10 and 15** are rejected under 35 U.S.C. 103(a) as being unpatentable over Yaung (U.S. Patent 6,512,850 B2, cited above, "Yaung") and Desai et al (U.S. Patent 6,072,904, cited above, "Desai") as applied to claim 8 above, in further combination with Hutcheson et al (U.S. Patent 5,161,204, newly cited, "Hutcheson").

36. In regards to **claim 10**, Yaung and Desai do not expressly disclose the device wherein when the image storage unit stores a specific number of image data pieces, the clustering unit and the sorting register unit execute clustering and sorting of the image data pieces stored in the image storage unit.

Hutcheson teaches in col 17, lines 23-27, a device wherein when the image storage unit stores a specific number of image data pieces, the clustering unit and the sorting register unit execute clustering and sorting of the image data pieces stored in the image storage unit.

Art Unit: 2625

It would have been obvious to one of ordinary skill in the art at the time of the invention to incorporate the teachings of Hutcheson into the device of Yaung and Desai because it provides sufficiently reliable addressing of element clusters over large databases (Hutcheson, col 17, line 41).

37. In regards to **claim 15**, Yaung and Desai do not expressly disclose the device wherein when more than a specific number of image data pieces are added in the image storage unit after sorting by the sorting register unit, the clustering unit and the sorting register unit destroy the existing sorting and execute clustering and sorting of all the image data pieces stored in the image storage unit.

Hutcheson teaches in col 17, lines 23-27, the device wherein when more than a specific number of image data pieces are added in the image storage unit after sorting by the sorting register unit, the clustering unit and the sorting register unit destroy the existing sorting and execute clustering and sorting of all the image data pieces stored in the image storage unit.

It would have been obvious to one of ordinary skill in the art at the time of the invention to incorporate the teachings of Hutcheson into the device of Yaung and Desai because it provides sufficiently reliable addressing of element clusters over large databases (Hutcheson, col 17, line 41).

38. **Claim 13** is rejected under 35 U.S.C. 103(a) as being unpatentable over Yaung (U.S. Patent 6,512,850 B2, cited above, "Yaung") and Desai et al (U.S. Patent 6,072,904, cited above, "Desai") as applied to claim 8 above, in further combination with Sato et al (JP 11-136573, newly cited, "Sato").

Art Unit: 2625

39. In regards to **claim 13**, Yaung and Desai do not expressly disclose the clustering unit and sorting register unit executing sorting of the new image data piece on the basis of the relation with the characteristic value acquired from the center of gravity of the existing clusters relating to the image data pieces stored in the image storage unit.

Sato teaches in paragraph 0026 the the clustering unit and sorting register unit executing sorting of the new image data piece on the basis of the relation with the characteristic value acquired from the center of gravity of the existing clusters relating to the image data pieces stored in the image storage unit.

It would have been obvious to one of ordinary skill in the art at the time of the invention to incorporate Sato's teachings into Yaung and Desai's device because it enables the addition of information at one time by collecting the whole classification and enabling it to add information by its classification (Sato, paragraph 0014).

40. **Claim 14** is rejected under 35 U.S.C. 103(a) as being unpatentable over Yaung (U.S. Patent 6,512,850 B2, cited above, "Yaung") and Desai et al (U.S. Patent 6,072,904, cited above, "Desai") as applied to claim 8 above, in further combination with Craver et al (U.S. Patent 6,233,367 B1, newly cited, "Craver").

In regards to claim 14, Yaung and Desai do not expressly disclose the clustering unit and the sorting register unit executing sorting of the new image data piece on the basis of a center value of the relations between the characteristic value of the new image data piece and the characteristic values of the image data pieces each stored in the image storage unit.

Craver teaches in col 7, line 67, the clustering unit and the sorting register unit executing sorting of the new image data piece on the basis of a center value of the relations between the characteristic value of the new image data piece and the characteristic values of the image data pieces each stored in the image storage unit.

It would have been obvious to one of ordinary skill in the art at the time of the invention to incorporate Craver's teachings into Yaung and Desai's device because the target image can be compared with an entire group (col 8, line 2), thereby saving computational time.

41. **Claims 1, 2, 4, 21, and 22** are rejected under 35 U.S.C. 103(a) as being unpatentable over Craver et al (U.S. Patent 6,233,367 B1, cited above, "Craver").

42. In regards to **claim 1**, Craver discloses in one embodiment an image sorting device (Fig 6) comprising: a characteristic value extraction unit (col 7, lines 1-7) that extracts a characteristic value of an image data piece from the image data piece, wherein extracted characteristic values are expressed in I_j dimensional vector ($j = 1, 2, \dots, n$, here $1 \leq I_j$, $1 \leq n$) in which n types of characteristic value vectors are obtained (col 7, lines 3-7 and 14-16); and a relation evaluation unit (col 7, lines 8-13) that evaluates a mutual relation between the characteristic value vectors that the characteristic value extraction unit extracts from plural image data pieces.

Craver discloses in another embodiment a clustering unit (col 7, line 63) that executes clustering to events expressed by the characteristic value vectors of the plural image data pieces on the basis of an evaluation result of the relation acquired by the relation evaluation unit.

Art Unit: 2625

Craver discloses in a third embodiment a sorting register unit (col 8, lines 37-45) that automatically sorts the plural image data pieces on the basis of a result of clustering by the clustering unit.

It would have been obvious to one of ordinary skill in the art at the time of the invention to combine the first Craver embodiments with the second Craver embodiment because like images would be more likely to be placed next to each other (col 7, line 54). It would have been obvious to one of ordinary skill in the art at the time of the invention to combine the first and second embodiments with the third embodiment because it allows easy selection of the target image from any of the displayed images (col 8, line 59) and images further away from the target image is displayed with a smaller size to denote greater dissimilarity (col 8, line 40).

The section the Examiner references regarding a sorting register includes: "Additionally, in one embodiment, images further away from the center, or target image, are displayed with a smaller size to denote greater dissimilarity from those images closer to the center." (col 8, line 39). This statement directly implies a sorting register structure to place the images in an order of similarity/dissimilarity from a center image. Therefore, Craver teaches or suggests a sorting register as claimed. See also the display structures in Fig 4 and 5.

43. In regards to **claim 2**, Craver further discloses the device wherein: the characteristic extraction unit extracts the n types of characteristic value vectors (col 7, lines 3-7 and 14-16) as the characteristic value of the image data; and the relation evaluation unit (col 7, lines 8-13), synthesizing the n types of the characteristic value vectors to each of the n types of characteristic value vectors that the characteristic value extraction unit extracts from the plural image data pieces, evaluates the relation between the image data pieces based on synthesis result.

Art Unit: 2625

44. In regards to **claim 4**, Craver further discloses in col 7, line 50, the device wherein the clustering unit executes clustering by means of a hierarchical method that joins clusters on the basis of the relation between the clusters.

45. In regards to **claim 21**, all the elements set forth in this claim have been addressed in the argument of claim 1.

46. In regards to **claim 22**, all the elements set forth in this claim have been addressed in the argument of claim 2.

Conclusion

47. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Japanese KOKAI **JP-11136573** discloses a video information adding method which sorts the representative images according to feature value vectors.

48. Applicant's amendment necessitated the new ground(s) of objection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event,

Art Unit: 2625

however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

49. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Christopher T. Sukhaphadhana whose telephone number is (703) 306-4148. The examiner can normally be reached on 9a-5p M-F.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Bhavesh M. Mehta can be reached on (703) 308-5246. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

CTS



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